MATHS

BOOKS - CALCUTTA BOOK HOUSE MATHS (BENGALI ENGLISH)

SAMPLE QUESTIONS PAPERS

Question

1. A person deposite ₹ 100 in a bank and after 2 yars he got a total ₹121 as a return. Then the componund interest of the bank per annum is

A. 0.1

B. 0.2

C. 0.05

D. $10\frac{1}{2}\%$

Answer: A

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2. If a be apositve number such that a $= \frac{27}{64} = \frac{3}{4}$:a then the value of a will be

A. $\frac{81}{256}$

B. 9

C. $\frac{9}{16}$

D. $\frac{16}{9}$

Answer: C

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3. Find the roots of the equation by the method of completing the square $2x^2 - 6x + 1 = 0$

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4. If $2x = \sec A$ and $\frac{2}{x} = \tan A$, then the value of $2\left(x^2 - \frac{1}{x^2}\right)$ will be

A. $\frac{1}{2}$

B. $\frac{1}{4}$

C. $\frac{1}{8}$

D. $\frac{1}{16}$

Answer: A

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5. A right circular cylnder of same radius is made by melting a right melting a rightcirucular cone. If height of the culinder be 5 cm, then the height of cone will be

A. 10 cm

B. 15 cm

C. 18 cm

D. 24 cm

Answer: B

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6. The radius of a circle is increased by 2cm from 5 cm to 7 cm .

What is the percentage change in area of the circle ?

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7. The amount of ₹ a in 20 years at the rate of simple interest of a

% per annum is .....

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8. The conjugate surd of $\left(\sqrt{3}-3\right)$ is .....

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9. Any cyclic parallelogram is a ..... Figure.

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10. The value of ($\sin 12^\circ \times \cos 18^\circ \times \sec 78^\circ \times \text{cosec} 72^\circ$) is .....

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11. If the numerical values of the volume and the curved surface area of a right cirular cylinder be equal, then the length of the sdiameter of the cylinder will be ..... Units.

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12. If the average of $(a_1, a_2, a_3 \ldots\ldots\ldots\ldots\ldots\ldots, a_n)$ be $\bar{a}$ then the average $(xa_1, xa_2, xa_3, \ldots\ldots\ldots\ldots\ldots\ldots xa_n)$, where $x \neq 0$,will be .....

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13. In a business the ratio of principals of Laxmi and Narayana is 4:5. If Laxmi's profit be ₹ 80, then the profit of Narayana is ₹ 100.

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14. $2\sqrt{\pi}$ is a quadratic surd.

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15. If the ratio of three sides of a triangle be 3:4:5, then the triangle will be always a right - angled triangle.

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16. In ΔABC, $\angle B = 90^\circ$ If $AB = BC$ then prove $\angle C = 45^\circ$

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17. The volume of a right circular cone remains the same when its radius of base is doubled and height is halved.

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18. The mode of the frequency distributions 2, 3, 9, 10, 9, 3, 9, is 10.

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19. Find the rate of simple interest in percent per annum if the simple interest of a principal is $\frac{3}{5}$ part of the amount in 10 years.

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20. Determine the period of time if a principal be doubled in t years at a fixed rate of compound interest in percent per annu.

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21. If one of the roots of the quadratic equation be $x^2 - (1+b)x + 6 = 0$ be 2, then find the other root.

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22. If $\frac{a}{2} = \frac{b}{3} = \frac{c}{4} = \frac{3a - ab + 4c}{p}$, then find the value of p.

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23. Simplify : $\sqrt{2} - \sqrt{18} + \sqrt{27} - \sqrt{32}$

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24. If $x \propto y^2$ and y = 2a, when x = a, then find the relation between x and y.

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25. AB is a diameter of the circle with centre at O. R is any point on the circumference of the circle. If $\angle ROA = 120^\circ$, then firnd the volue of $\angle RBO/$

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26. Find the roots of the equation by the method of completing the square $3x^2 + 6x + 5 = 0$

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27. The lengths of sides of three cubes are 3 m, 4 m 5 m respectiveluy. A solid cube is made by melting these these cubes. Fing the length of the side of this large cube in centimetre.

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28. If $0^\circ < \theta < 90^\circ$, then find the least value of ($9\tan^2\theta + 4\cot^2\theta$).

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29. Fing the value of $\tan 1^\circ \tan 2^\circ tha^\circ \ldots\ldots\ldots\ldots\ldots \tan 89^\circ$.

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30. If $u_i = \frac{x_i - 25}{10}$, $\sum f_i u_i = 20$ and $\sum f_i = 100$ then find the value of $\bar{x}$.

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31. At the rate of 10% compound interest per annum find the principal of which the compound interest in 3 years is ₹ 2979.

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32. Puja, Uttam and Bireendra started a pertnership business with capital ₹ 5000, ₹ 7000 and ₹ 10000 respectively by this

condition that (i) the monthly expenditure of managing the business is ₹125, (ii) Puja and uttam will gety ₹ 200 each per month for keeping the accounts upto date. If at the end of the year the total profit of the business be ₹ 6960, then find the share of profit of each of them.

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33. Solve : $\frac{1}{x} - \frac{1}{x+b} = \frac{1}{a} - \frac{1}{a+b}[x \neq 0, \ -b]$

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34. If the cost of pens decreses by ₹ 6 per dozen then 3 more pens can be bought for ₹ 30. Fing the cost of pens per dozen before the decrement.

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35. y is the sum of two variables, one of which vaaries directly with the variable x and the other varies inversetly with x, If y = -1 when x = 1 and y = 5 when x = 3, then find the relation between x and y .

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36. An agricultural co-operative society of village Pachla has purchased a tractor. Previously 2400 bighas of land were cultivated by 25 ploughs in 36 days. Now half of th land can be cultivated only by that tractor in 30 days. Calculate by using the theory of variation the number of ploughs work equally with one tractor.

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37. If $\frac{a+b-c}{a+b} = \frac{b+c-a}{b+c} = \frac{c+a-b}{c+a}$ and $a+b+c \neq 0,$ then prove that a = b = c.

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38. If $x = \frac{4ab}{a+b}$, then find the value of $\frac{x+2a}{x-2a} + \frac{x+2b}{x-ab}$

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39. State and prove Pythangoras theorem.

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40. Prove that the opposite angles of a cyclic quadrilateral are suplemenary.

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41. In $\Delta ABC, \angle A = 90^\circ$ If CD be a median, then prove that $BC^2 = CD^2 + 3AD^2$

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42. Construct a circle of radius $2 \cdot 8$ cm. Take a point at a distance of 8 cm from the centre of this circle. Then draw two tangents to this circle from that point.

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43. If the sum of two angles be 135° and the difference of them be $\frac{\pi}{12}$, then determine the sexagesimal and circular measures of the two angles.

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44. If $x\sin 60^\circ \cos^\circ 30^\circ = \frac{\tan^2 45^\circ \sec 60^\circ}{\text{cosec } 60^\circ}$ then find the value of x.

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45. If $\tan 50^\circ = \frac{p}{q}$, then find the value of $\cos 40^\circ$.

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46. A passenger of an aeroplane observes that Howrah station is at one side of the plane and Saheed minar is just on the opposite side. The angles of Howrah station and Saheed minar from the passenger of aeroplane are 60° and 30° respectively, If

the aedroplane is a height of $544\sqrt{3}$ metres at that time. find the distance between Howrah station and Saheed minar.

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47. The lengths of shadow of a tower standing on the ground is found to be 64 metres more when the sun's angle of clevation changes from 45° to 30°. Find the height of the tower. (Let $\sqrt{3} = 1 \cdot 732$)

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48. If 64 water - filled buckets of equal volume are taken out from a cubical water - filled tank, then $\frac{1}{3}$th of water remains in the tank. If the length of one edge of the tank is $1 \cdot 6$ metres, then calculate the quantity of water that can be hold in each bucket ?

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49. A right circular cylindrical tank of 9 metre height is filled with water. Whater comesout from there through a pipe having length of 6 cm diamter with a speed of 225 metres per minute and the tank becomes empty after 36 minutes. Calulate the length of radius of the tank.

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50. Calculate how many bullets with lengths of 1 cm radius may be formed by melting a solid sphere of iron having 8 dcm length of radius.

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51. Find the value of $\left(\sqrt{2}+\sqrt{3}\right) \div \left(\sqrt{2}-\sqrt{3}\right)$.

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52. Find the value of $\left(\sqrt{5}+2\right) \div \left(\sqrt{3}-1\right)$.

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53. Find the value of $4 \div \left(3-\sqrt{2}\right)$.

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54. If a principal becomes dublein 10 years. Then the rate of simple interest in prescent per annum will be

A. 0.05

B. 0.1

C. 0.15

D. 0.2

Answer: B

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55. The mean - proportional of 16 and 25 is

A. 400

B. 100

C. 20

D. 40

Answer: C

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56. O is the circumcentre of ΔABC and if $\angle OAB = 50^\circ$, then the value of $\angle ACB$ will be

A. 50°

B. 100°

C. 40°

D. 80°

Answer: C

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57. $\frac{\pi}{6}$ redian =

A. 60°

B. 45°

C. 90°

D. 30°

Answer: D

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58. If the ratio the volumes of two solid sphres is $1:8$, the ratio of their curved surface areas is

A. $1:2$

B. $1:4$

C. $1:8$

D. $1:16$

Answer: B

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59. If the average of the numbers 6, 7, x, 8, y, 14, be 9, then

A. $x + y = 21$

B. $x - y = 21$

C. $x + y = 19$

D. $x - y = 19$

Answer: C

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60. The quantity of compound and simple interest of a certain principal at a fixed rate of annual interest in percent in 1 year are .....

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61. If $x \propto \frac{1}{y}$ and $y \propto \frac{1}{z}$, then x $\propto$ .....

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62. The greatest chord of a circle is.....

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63. The number of diagonals of a rectangular parallelopiped is.....

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64. Arithmetic mean, median and mode are measures of ..... Tendency .

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65. In a partnership business, the minimum nunber of partnrs is 3.

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66. The roots of the quadratic equation $x^2 + x + = 0$ are imaginary.

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67. If the length of a rectangular field is doubled and its breadth is halved (i.e, reduced by 50%) . What is percentage change in its area ?

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68. The amount of angle produced by 2 complete recolution of a its end - points as the centre anti - clockwse is 720°

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69. In rainy season, if the hight of rain - water in 2 hectors of land be 5 metres, then the volume of rain-water is 1000 cubic - metres.

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70. The mode of the distributions 2, 3, 9, 10, 9, 3, 9 is 9.

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71. What is the rate of simple interest per annum, when the interest of some money in 2 year will be $\frac{1}{3}$ part of its maount (principal along with interest)?

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72. If the price of a machine depreciaters at the rate of r% per annum, then prince of the mechine is ₹ V after t years. Determine what was the price of the machine begore t years.

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73. If $a \propto b, b \propto c$ and $c \propto a$, then find the product of three non-zero variation constants.

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74. Find the product of $3^{\frac{1}{2}}$ and $3\sqrt{3}$

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75. P is any point inside the circle with centre at O. If the radius of the circle be 5 cm and OP = 4 cm, then determine the length of the chord passing throgh P and which is also the least in length.

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76. AOB is the diameter of a circle. C is a point on the circumference of the circle. If $\angle OAC = 60^\circ$ then find the value of $\angle OBC$.

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77. O is the centre of a circle and AC is one of its diamter. If $\angle AOB = 80^\circ$ and $\angle ACE = 10^\circ$, then find the value of $\angle BEC$.

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78. The value of an angle is D in degree and R in radian. Find the value of $\frac{D}{R}$.

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79. If $r\cos\theta = 2\sqrt{3}, r\sin\theta = 2$ and $0^\circ < \theta < 90^\circ$, then determine the value of both r and θ.

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80. If the number of plane surfaces of a cuboid = x, number of edges = y, number of vertices = z and number of diagonals = p, then find the value of $(x + y - z - p)$.

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81. The lengths of radii of a solid right crcular cone and a solid sphere are equal. If their - volumes be also equal, then find the ratio of the radius of the sphere and the height of the cone.

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82. The arithmitic mean of a frequency distraction is 8. If $\Sigma f_i x_i = 130 + 5k$ and $\Sigma f_i = 20$, then find the value of k.

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83. A person took a loan of ₹ 4000 from a bank at tha rate of 7% simple interest per annum and just after 1 year he took another loan of ₹ 4000 from the same bank at the rate of 8% simple interest per annum. Calculate after how many years of taking the secoond loan, the interest of his two loans will be equal .

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84. Three potters from Kumartuli collectively took a loan of ₹ 100000 from a co-operative bank to set up a modelling workshop. They mode a contract that after paying back the annual bank instalment of ₹ 28010, they would divide half of the profit among themselves in terms of the number of working day and the other half will be equally will be equally divided among them, Last year they worked 300 days, 275 days 350 days respectively and made of profit of ₹ 139010. Calculate th sheare of each in this profit.

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85. Solve : $x^2 + \left(8 + \sqrt{11}\right)x + \sqrt{704} = 0$

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86. The sum of the squares of two consecutive positive odd numbers is 802. Find the two numbers.

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87. If $\left(x^3 - y^3\right) \propto \left(x^3 + y^3\right)$ then prove that (x - y) $\propto$ (x + y)

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88. Simplify : $\frac{3\sqrt{2}}{\sqrt{3}+\sqrt{6}} - \frac{4\sqrt{3}}{\sqrt{6}+\sqrt{2}} + \frac{\sqrt{6}}{\sqrt{2}+\sqrt{3}}$

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89. If $x = cy + bz, y = az + cx, z = bx + ay,$ then prove that $\frac{x^2}{1-a^2} = \frac{y^2}{1-b^2}$

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90. If $\frac{x}{y+z} = \frac{y}{z+x} = \frac{z}{x+y}$, then prove that the value of each ratio is either $\frac{1}{2}$ or -1

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91. Prove that front formed at the centre of a circle by an arc is the double of the angle formed by the same arc at point on the circle.

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92. Prove that if two triangles are equiangular. Then corresponding sides are in the same ratio. I,e,. Their corresponding sides are proportional.

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93. If the radius of cylinder is doubled, but height is reduced by 50% . What is the percentage change in volume ?

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94. Two circles intersect each other at P externally. The straight QR touches the circle at two points Q and R. Prove that $\angle QPR = 1$ right angle.

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95. Determin the value of square root of 29 by geometric method.

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96. If $\cos\theta + \sec\theta n = 2$, then find the value of $\left(\cos^{11}\theta + \sec^{11}\theta\right)$

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97. Prove that $\operatorname{cosec}^2 24 \cot^2 66^\circ = \sin^2 24^\circ + \sin^2 66^\circ + \cot^2 66^\circ.$

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98. The heights of two towers are 210 metres and 70 metres respectively. If the angle of elevation of the top of the first twoere form the bottom of the second tower be 60° , then find the angle of elevation of the top of the scecond tower from the bottom of the first tower.

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99. Narayan, standing in the midst of a field, observes a flying bird in his north at an angle of elevation of 30° and aft er 21 minutes he observes the bird in his south at an angle of elevation of 60°. If the bird flies in a s traight line all a height of $50\sqrt{3}$ metres, then find its speed in metre per minuts.

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100. The length of circumference of the base of a right circular cylinder is $15 \cdot 4$ cm and its height is 10 cm. Fing the volume of the cylinder.

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101. If the ratio of the radii of two spheres be 1 : 2, then find the ratio of their curved surfac areas.

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102. If the circumference of the bases of a right circular cone $2 \cdot 2$ metres and its height be 45 dcm. Then find volume of the cone .

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103. $\sqrt{6} \times \sqrt{15} = x\sqrt{10}$.then find the value of x.

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104. Subtract the number $\left(7 - \sqrt{3}\right)$ and $\left(3 + \sqrt{3}\right)$

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105. Subtract the number $\left(10 - \sqrt{11}\right)$ and $\left(-5 + 3\sqrt{11}\right)$

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106. The present price of a machine is ₹ 2V. If the price of the machine depriciates at a rate oa 2r% per annum, then the pricen of the machine after 2t year will be

A. ₹$V\left(1-\frac{r}{100}\right)^{t}$

B. ₹$2V\left(1-\frac{r}{50}\right)^{t}$

C. ₹$V\left(1-\frac{r}{50}\right)^{2t}$

D. ₹$2V\left(1-\frac{r}{50}\right)^{2t}$

Answer: B

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107. Falgumni, Shreya and Smita started a partnership bussiness ₹ 6000. At the end of one year Falguni, Shreya and Smita received ₹100, ₹150 and ₹50 respectively as profit share. Then the maount of Shreya's capital that was nvested in the business is

A. ₹ 1000

B. ₹ 2000

C. ₹ 3000

D. ₹ 4000

Answer: B

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108. If $p + q = \sqrt{13}$ and $p - q = \sqrt{5}$, then the value of 2pq is

A. 2

B. 4

C. 9

D. 18

Answer: A

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109. In the trapezium ABCD, $AB||CD$ and two points P and Q are on the sides AD and BC respectively in such a way that $PQ||DC$. If $PD = 18cm$, BQ =35 cm, QC = 15 cm, then the length of AP will be

A. 42 cm

B. 60 cm

C. 30 cm

D. 15 cm

Answer:

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110. Which one of the followings is correct ?

A. $1^\circ = 1^c$

B. $1^\circ > 1^c$

C. $1^\circ < 1^c$

D. non of these

Answer: C

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111. If 35 is Removed from the Data: 30, 34, 35, 36, 37, 38, 39, 40, Then the Median Increased by -

A. $0 \cdot 5$

B. 1

C. $1 \cdot 5$

D. 2

Answer: A

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112. A man who takes a loan is called.....

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113. If $x \propto y$ and $x \propto z$, tehn (y + z) $\propto$ .....

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114. All of the diameters of the circle passes through the.....

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115. The sexagesimal value of the supplementary angle of $\frac{3\pi}{8}$ is .....

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116. The volume of the gratest solid cone that can be cut of from a solid hemisphere of diameter r unit is .....

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117. The three co-terminus edges of a rectangular solid are 36 cm, 75 cm and 80 cm respectively . Find the edge of a cube which will be of the same capacity :

A. 60

B. 52

C. 46

D. none of these

Answer:

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118. In case of compound interest, interset is to be added to principal at the fixed time interval, i.e., the amount of principal increases continuously.

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119. In ΔABC, the point at which the bisectors of the angles $\angle ABC$ and $\angle BAC$ intersect is called the incentre of the triangle.

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120. If $\sin 3\theta = \cos 6\theta,$ then $\tan(60^\circ - 3\theta) = \frac{2}{\sqrt{3}}$

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121. If the ratio of the curved surface areas of two hemispheres be 4 : 25, then the ratio of their radii will 2 : 3.

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122. The median of 3, 4, 18, 20, 5 is 5.

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123. The rate of simple interest reduces from 4% to $3\frac{1}{4}\%$ and for this, Amalbabu's annual income decreases by ₹60. Determine Amal babu's principal.

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124. If the rate of increase in population of is r% per year, the population after t years is p, Find the population that was t years before.

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125. Fomd the value of a when (-1) is a root of the equation $x^2 + ax + 3 = 0$

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126. Determine which one of the two quanitties $\left(\sqrt{15}+\sqrt{3}\right)$ and $\left(\sqrt{10}+\sqrt{8}\right)$ is greater.

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127. If $x \propto \frac{1}{y}$ and $y \propto \frac{1}{z}$, then determine whether x and z are in directt or inverse variation.

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128. If in ΔABC, $AB=(2a-1)cm$, $BC=2\sqrt{2a}cm$ and $AC=(2a+1)$ cm, then find the value of $\angle ABC$.

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129. Find the value of the complementrary angle of the angle $63^\circ 25' 15''$.

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130. Prove that $\sqrt{\frac{1+\cos 390^\circ}{1-\cos 30^\circ}} = \tan 60^\circ + \sec 60^\circ$

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131. If a solid right circular rod of length 1 dcm is made by melting a solid silver - sphere of diameter 6 dcm, then find the radius of the rod.

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132. The numberical values of the volume and total surface areas of a solid hemisphere are equal. Find the length of diameter of the hemisphere.

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133. A hemisphere of internal diameter 36 cm is filled with water . If this water is poured into right circular bottles of radius 3 cm and of height 6 cm , then how many bottles will be needed ?

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134. What is mode ? State the formula of mode for grouped frequency distribution.

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135. At the same rat of simple interest in present per annum, if a principle becosmes the amount of ₹ 7400 in 8 years and of ₹ 6200 in 4 years, then determine the principal and rate of simple intest in percent per annum.

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136. Rate of increase in polpulation of a state is 2% in a year. The present populatio is 800000000. Calculate the population of the state aftere 2 years.

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137. Solve : $\frac{1}{a+b+x} = \frac{1}{a} + \frac{1}{b} + \frac{1}{x}[x \neq 0, -(a+b)]$

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138. The tens' digit of a two digit number is less by 3 than the unit digit. If the product of the two digits are subracted from the number, the result is 15. Find the unit digit of the number.

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139. The price of a diamond is ₹ 2000. The diamond is broken into two pieses of equal weights. If the price of a diamond varies as the square of its weight, then find the amount of loss for the breakage.

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140. If $x = 3 + 2\sqrt{2}$, then find the value of $\left(\sqrt{x} - \frac{1}{\sqrt{x}}\right)$

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141. If $a + \frac{1}{b} = 1$ and $b + \frac{1}{c} = 1$ then prove that $c + \frac{1}{a} = 1$

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142. If a, b, c be in continued proportional, then prove that $a^2b^2c^2\left(\frac{1}{a^3} + \frac{1}{b^3} + \frac{1}{c^3}\right) = a^3 + b^3 + c^3$

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143. Prove that angles in the same segment of a circle are equal.

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144. Prove that if two tangents are drawn to a circle from a point outside it, then the line segments joining the point of contact and the exterior point are equal and they subtend equal angles at the centre.

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145. ABCD is a parallelogram. A circle passing through C and D intersects AD and BC at the points E and F. Prove that the four points E, A, B, F are concyclic.

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146. Construct a circle of radius $2 \cdot 6$cm. Take a point outside of this circle in such a wasy that the distance of it from the centre

of the circle is 8 cm. Also draw a tangent to this circle from that exterior point. (Give construction signs only)

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147. The length of radius of a circle is 21 cm. Determine the cfircular and sexagesimal measures of the central angle produced by an are of length $5 \cdot 5$ cm of this circle.

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148. Find the value :

$$\frac{\tan^2 60^\circ + \tan 30^\circ}{1 + \tan^2 60^\circ + \tan 30^\circ} + \cos 60^\circ \cos 30^\circ - \sin 60^\circ - \sin 30^\circ$$

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149. If $\angle A + \angle B = 90^\circ$ then prove that $1 + \frac{\tan A}{\tan B} = \text{cosec}^2 B$

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150. If the angle of elevation of the top of a chimney from a point on the horizontal plane passing through the foot of the chimney is 60° and the angle of elevation from another point on the same plane at a distance of 24 metres away from the first point is 30°. Calculate the height of the chimney. $[\sqrt{3} = 1.732(\text{approx}).]$

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151. If the angle of depression of two consecutive kilometer stones on a road from an aeroplane are 60° and 30° respectively. Find the height of the areroplance when the two kilometre stones stand on the same side of aeroplane.

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152. How many solid sphere of radius $10 \cdot 5$ cm each can be mad by melting a solid cuboi dal piece of copper of length $6 \cdot 6$ dcm, breadth $4 \cdot 2$ dcm and thickness $1 \cdot 4$ dcm ?

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153. To prepare a tent of shaped a right circular cone, it needs 77 sq-metres of canvas. If the slant height of the tent be 700 cm. then find the area of the tent.

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154. The external diameter of a gold - sphere is 12 cm and it is made of a gold - plate of thichness 1 cm. If the weight of 1 cc gold be $19 \cdot 5$ gm and the price of 1 gm gold is ₹ 1280, then find the total price of the gold - sphere.

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155. If x_1 and $x_2$be any two positive variables and if the arithmetic mean of these two values be A, geometric mean be G and harmonic mean be H, then peove that $G^2 = AH$

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156. prove that $\sqrt{108} - \sqrt{75} = \sqrt{3}$

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157. Find the addition of $\left(2+\sqrt{3}\right)$ and $\left(2-\sqrt{3}\right)$

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